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AUTHOR Casteel, J. Doyle; And Others
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ABSTRACT

The Social Science Observation Record is a systematic observation system. When used to provide feedback to preservice social studies teachers participating in a teach-reteach microteaching sequence, subjects obtained a significant increase in value-oriented student behavior. When used to analyze printed transcripts of mathematics teachers, teacher-student categories of the system were found to be related to the relative frequency with which teachers used conditional reasoning moves. When used to analyze the performance of preservice science teachers involved in microteaching, the teacher-student categories were found to be associated with growth in the frequency of probing questions. The implications are that (1) similar profiles result from different training approaches, (2) the effects of component skills on student verbal patterns can be analyzed, and (3) it appears probable that mathematics, science, and social studies teachers can learn to recognize and evoke similar valuing operations from students as a result of microteaching experiences. (Author)

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THE SOCIAL SCIENCE OBSERVATION RECORD, A THEORETICAL MODEL RELEVANT TO VALUE CLARIFICATION IN MATHEMATICS, SCIENCE, AND SOCIAL STUDIES

J. Doyle Casteel
University of Florida

John W. Gregory
University of Florida

John J. Koran, Jr.
University of Florida

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INTRODUCTION

The Social Science Observation Record (SSOR) is a multi-dimensional observation system. It was originally conceived in order to provide a model for relationships between student statements associated with the learning of social studies content and student statements associated with the clarification of personal and social values. In addition to this use, the SSOR is used as a systematic observation schedule whereby data concerning verbal classroom transactions can be collected. Persons trained to interpret the system can use data collected in order to provide teachers with feedback concerning their instructional performance.

The Social Science Observation Record is also sensitive to technical teaching skills such as hypothetico-deductive structuring moves, probing questions, reinforcement, and wait-time. Therefore, the system can be used as a training method for assisting teachers in the modification of their teaching behavior thus securing instructional results they wish to obtain (and the antithesis, to avoid results they wish to avoid).

Since the student categories of the system and the teaching skills to which the instrument is sensitive are not content bound, the SSOR possesses relevance for those interested in value clarification as a dimension of mathematics, science, or social studies instruction.

The intent of this paper is three-fold: (1) to present an overview of the elements of the SSOR; (2) to present data storage and display options with regard to those aspects of the system that are particularly germane to the idea of value clarification; and (3) to present a sampling of empirical data from social studies, math and science sufficient to suggest the types of technical skills with regard to which the instrument is believed to possess potential.

ELEMENTS OF THE SYSTEM

The Social Science Observation Record contains four realms and seventeen categories. Realm I stresses those verbal behaviors that are associated with lessons where the intent is to have students learn the content conveyed by a textbook or other learning resource. It is referred to as the subject-centered realm.

Realm II emphasizes those verbal behaviors a teacher or student may use in order to elicit from, or react to, student verbal behaviors in either Realm I or Realm III. This realm is called the teacher-centered realm.

Realm III accents those verbal behaviors that are associated with instructional activities where the intent is to help students clarify values. This realm is referred to as the man-centered realm.

Realm IV provides for non-verbal behavior and, especially, for silence as an integral aspect of verbal interactions that occur during instruction. This realm is called the non-verbal realm.

When a classroom interaction is being coded only student statements may be recorded as occurring in the subject-centered or man-centered realms. Either student or teacher statements may be recorded as occurring in the teacher-centered realm; however, this realm is most frequently used for coding teacher behavior. The seventeen categories and the nominal numbers by which they are coded are presented in figure 1. One illustrative function for each category in the system is also listed.

Figure 1: about here

In order to assess the face validity of the categories, thirty-two questionnaires were mailed to a selected sample of social studies educators who teach in colleges and universities. Each educator was asked to rate each category in terms of its importance as an element of social inquiry according to the following code:

(1) very insignificant

(2) insignificant

(3) somewhat insignificant

(4) no opinion

(5) somewhat significant

(6) significant

(7) very significant

Eighteen completed questionnaires were returned (56%).

Mean scores for two subject-centered categories were rated as "significant" (interpretive and clarifying statements). Four of the five man-centered categories were rated as "significant" (preferential, consequential, criterial, and imperative). No student category in either Realm I or III was rated as less than "somewhat significant" as an aspect of social study. In the opinion of those completing the questionnaire, the student categories of the SSOR have face and construct validity.

STORAGE AND DISPLAY OPTIONS

Data are collected on a three-second interval basis. An observer listens for three seconds and then generalizes the events he has heard during that interval in order to assign one of the seventeen SSOR category numbers to the interval. However, if there is a rapid change in behavior within a

three-second interval, the observer codes more rapidly in an effort to preserve as many interactions between categories as possible. (The definitions and ground rules used by coders are reported in Casteel and Stahl, 1973.) Data thus collected are stored or organized for feedback by constructing a matrix or a graph.

The matrix. In order to build a matrix, data are first paired. For example, if category 9 (a question) is followed by category 16 (an interval of silence), the interaction is called a "9-16 pair." Six consecutive codings are paired below.

first pair	7	
	7	second pair
third pair	7	
	9	fourth pair
fifth pair	16	
	12	

After data have been paired, each pair is entered into the SSOR matrix (figure 2). The vertical numbers (to the left

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Figure 2: about here

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of the matrix) refer to the first number in each pair. The horizontal numbers (across the top) are used to refer to the second number in each pair.

Once the matrix has been constructed, one can analyze data using twelve submatrices and six segments of the matrix. Each submatrix is referred to by a capital letter (A through L). These twelve submatrices are depicted in figure 3.

Figure 3: about here

The submatrices C, F, I and L are particularly relevant to the topic of value clarification.

If data is stored and displayed in submatrix C, students are shifting from the subject-centered to the man-centered realm. Frequent use of submatrix C would suggest that students may perceive the use of the man-centered categories during instruction to be a legitimate form of expression.

If data is stored and displayed in submatrix F, students are using man-centered statements immediately following teacher-centered behavior. Frequent use of submatrix F would suggest that the teacher is deliberately attempting to secure student statements in the man-centered realm.

If data is stored and displayed in submatrix I, students are expressing man-centered statements and this usage continues beyond three seconds. Frequent use of submatrix I would be interpreted as students expressing value-related statements with more completeness and, probably, that students are using the categories that comprise the man-centered realm configuratively.

If data is stored and displayed in submatrix H, the teacher is reacting verbally following student statements in the man-centered realm. For example, if the teacher asks a question (category 9) immediately after a student statement of preference (category 11), the 11-9 pair is tallied in submatrix H.

Six segments of the matrix are related to silence (category 16). These six segments are depicted in figure 4. Of these six segments, segments J_3 and K_3 are particularly germane to

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Figure 4: about here

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the topic of value clarification.

When an interval of silence occurs following student statements in the man-centered realm, data is stored and displayed in segment J_3. The occurrence of data in segment J_3 would suggest that the teacher and other students are waiting to ascertain whether or not a student who was using one or more of the man-centered categories has completed what he wished to say.

When an interval of man-centered behavior occurs following an interval of silence, such data is stored and displayed in segment K_3. If data is found in both J_3 and K_3 it is probable that students, when expressing themselves in the man-centered realm, feel free to pause and reflect on what they are saying.

They then continue to articulate their ideas with greater clarity than would be the case were the teacher unwilling to wait and too ready to react to student statements in the man-centered realm (Dove, 1973).

Graphing. SSOR data may also be stored or displayed in graphs. Graphing offers two major advantages. Teaching strategies, lost in the matrix, are preserved and may be studied. Technical teaching skills or factors requiring more than one SSOR coding can be analyzed. For purposes of illustrating these two advantages, a graph for five minutes of microlesson taught by a preservice social studies teacher is presented in figure 5.

Figure 5: about here

The teaching skill of wait-time is defined as an interval of silence, optimally, of at least five seconds duration (Dove, 1973). Thus, it requires at least two contiguous SSOR codings of silence (category 16) or a 16-16 pair. By graphing the SSOR data for a microteaching session (figure 5) how the teacher used wait-time and how this skill functioned as an element in the verbal environment of discussion can be studied. If the matrix were the only method used to store data and provide feedback, the frequency with which the teacher used the technical skill of wait-time would not be

readily available for analysis. The frequency and function of other technical skills related to value clarification (and other instructional goals) can also be studied from graphs. Some of these technical skills are identified below.

STUDIES

The S3OX has been used to provide feedback to preservice teachers in a number of teaching fields. It has also been used to describe the verbal behavior of teacher known to differ with regard to the frequency with which they use technical teaching skills. The intent here is not to report findings in detail but to illustrate that feedback derived from using the instrument may be utilized in order to secure instructional change and that the instrument is sensitive to particular teaching skills. To this end, data from three studies are presented.

Study 1. Twenty preservice social studies teachers who volunteered to participate in an experiment, viewed a film-mediated model of a young teacher who obtained a large number of man-centered statements from a group of microstudents. The Ss were then randomly assigned to experimental and control groups. Both groups taught two microlessons to different groups of microstudents. Immediately after the first microteach, each S watched a videotape replay of the lesson just completed.

Between the teach and reteach phases of the microteaching sequence, Ss assigned to the experimental group attended a session in which the categories, realms, and submatrices of the SSOR were explained. After this explanation, they were provided with a matrix containing data concerning their teach 1 performance. Ss were not to discuss their matrix with other subjects or with the investigators. They were told that they were to analyze and evaluate the data individually using their understanding of the SSOR to draw their own conclusions. All Ss then taught a second microlesson to a different group of microstudents using the same topic they had used for their first microteach.

Using teach 1 performance as a pretest, the experimental and control groups were compared using an analysis of covariance. Ss receiving SSOR feedback obtained a greater frequency of man-centered statements than did those Ss who did not receive feedback. The difference was significant ($p < .05$) for both Realm III and submatrix I (F-values = 5.116 for Realm III and 5.113 for submatrix I).

For this study, the investigators computed their between-observer reliability using Scott's (1955) formula. Reliability coefficients for realm and category reliability were 0.73 and 0.94 respectively.

Study 2. Gregory (1972) found a significant relationship between student growth in conditional reasoning ability and the frequency with which seventh grade mathematics teachers used conditional moves. Gregory defined a conditional move as "a statement or question in which a condition is given and a consequent follows or is to be supplied." (p. 3)

Two of the five transcripts for each of ten teachers involved in the Gregory study were randomly selected and coded using each typed line as a unit.

Data for twenty teaches was analyzed using step-wise regression analysis. This analysis led to the identification of SSOR measures which accounted for 89% of the variance between teachers who were high and teachers who were low in the frequency with which they used conditional moves. The SSOR variables associated with the frequency of conditional moves were the 7-7 cell (teacher commentary statements following teacher commentary statements) and the 7-9 cell (questions immediately following commentary statements). This led the investigators to believe that the SSOR could be used to mediate changes in the frequency with which teachers utilize conditional moves. (Research findings with regard to this hypothesis are reported elsewhere: Gregory and Casteel, 1974).

Between-observer reliability was checked prior to the coding of these transcripts (Scott). The coder was reliable with regard to categories (0.91), realms (0.93), and submatrices (0.90).

Study 3. Twenty-one videotapes of seven preservice science teachers teaching microlessons in a three-teach sequence were randomly selected. Of these, nineteen were coded (two were of insufficient audio quality for coding). The Ss were known to vary with regard to the frequency with which they used probing questions, reinforcement, and wait-time (Koran, Shea, Casteel, and Roy, 1976).

At the time of this study, between-observer reliability was computed (Scott). The coder was reliable with regard to categories (0.78), realms (0.85), and submatrices (0.86).

Correlational analysis led to the finding of significant relations ($p < .05$) between the frequency with which teachers asked probing questions and SSOR measures. Probing questions were related to the 9-16 cell frequency ($r = .50$) and percentage ($r = .52$).

Significant relations between reinforcement and SSOR measures were also found. Reinforcement was related to the 9-16 cell frequency ($r = .52$) and percentage ($r = .46$). Reinforcement was also related to the frequency with which students responded to teacher questions ($r = .43$) and to the

frequency and percentage of student statements following at least one interval of silence (r = .63 for frequency and .64 for percentage). When teachers were willing to wait, they apparently obtained student responses that they valued and consequently reinforced.

Wait-time, however, was negatively related to probing questions (r = -.50). Wait-time was positively and significantly related to the 7-7 cell of the SBCS (r = .46 for both frequency and percentage).

The positive relationship between wait-time and the 7-7 cell, in conjunction with findings in study 2 above, support the suggestion made by other investigators that teacher talk may have received less attention than should be the case (Gage and others, 1971). It may be that teacher use of commentary statements is a necessary element that must be included in the definition of teaching factors if such skills as conditional moves, wait-time, reinforcement, and probing questions are to be taught to teachers who lack these skills, and if instruction in these skills is to lead to their systematic employment during instruction.

These three studies have led the investigators to believe that the SBCS can be used to mediate technical teaching skills and to help teachers learn to use these skills functionally.

CONCLUSION

The SCOR is a multi-dimensional observation system. Elements of the system possess logical relevance for the concept of value clarification. The instrument can be used for purposes of providing feedback to teachers. It also possesses mediation potential for teaching such technical teaching skills as conditional moves, probing questions, reinforcement, and wait-time. The work reported here has enabled the investigators to begin developing protocols, designing instructional strategies, and analyzing a clustering approach to the teaching of technical skills.

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Figure 1: SEOR Categories

REALM	CATEGORY OF STATEMENT	FUNCTION**
I. Subject-Centered	1. Topical	identifying the focus
	2. Empirical	stating facts
	3. Interpretive	assigning meaning
	4. Defining	avoiding semantical confusion
	5. Clarifying	elaborating ideas
II. Teacher-Centered	6. Infirming	expressing disagreement
	7. Commentary	consolidating and structuring
	8. Dissonant	requesting clarification
	9. Interrogative	eliciting responses
	10. Confirming	accepting
III. Man-Centered	11. Preferential	assigning value ratings
	12. Consequential	anticipating effects
	13. Criterial	identifying the basis
	14. Imperative	considering decisions
	15. Emotive	expressing feelings
IV. Non-Verbal	16. Silence	wait-time
	17. Confusion	adjustment time

**The functions as given are meant to be illustrative but not inclusive.

Figure 2: SSOM Matrix

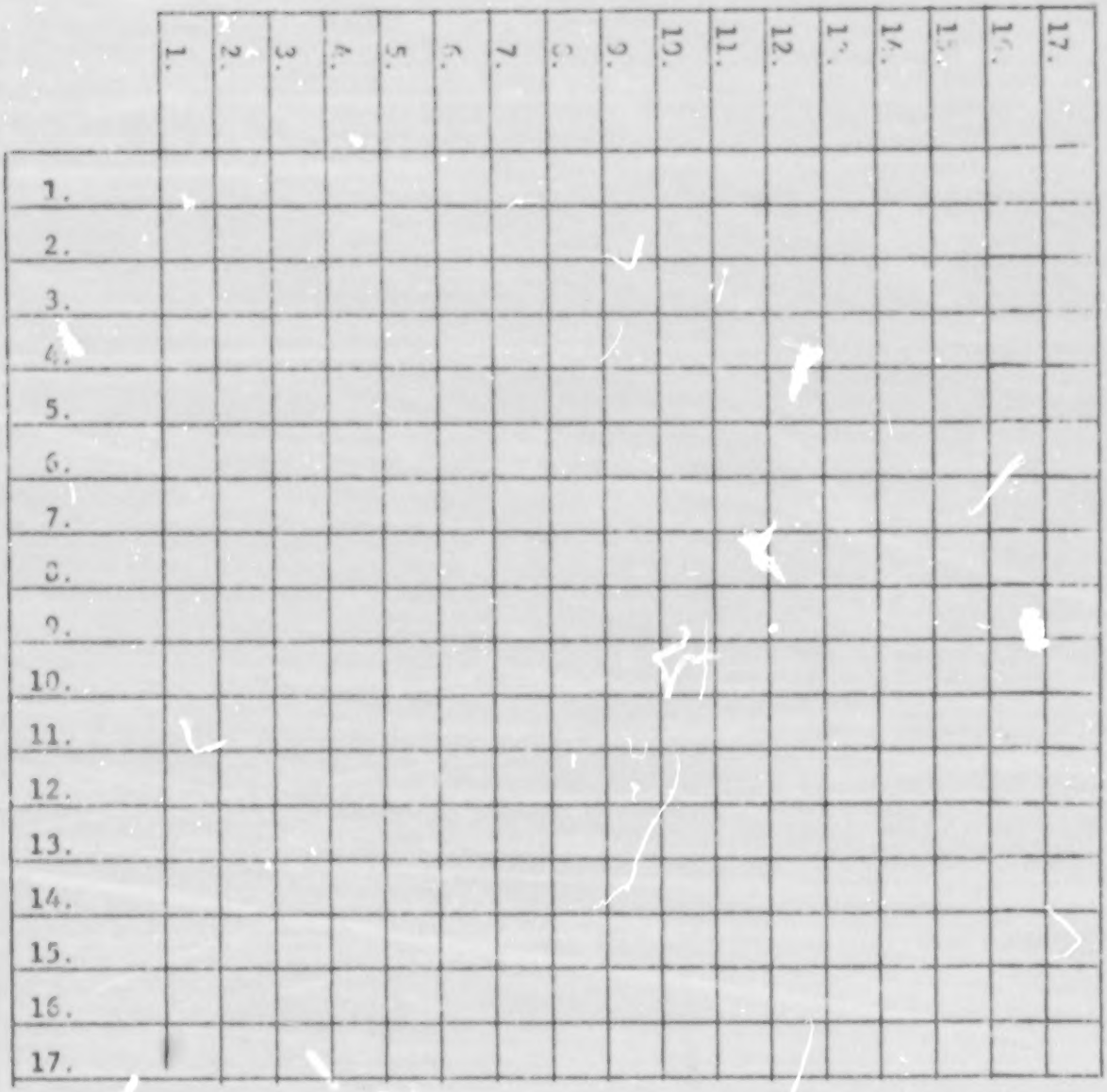

Figure 2: 2000 Submatrices

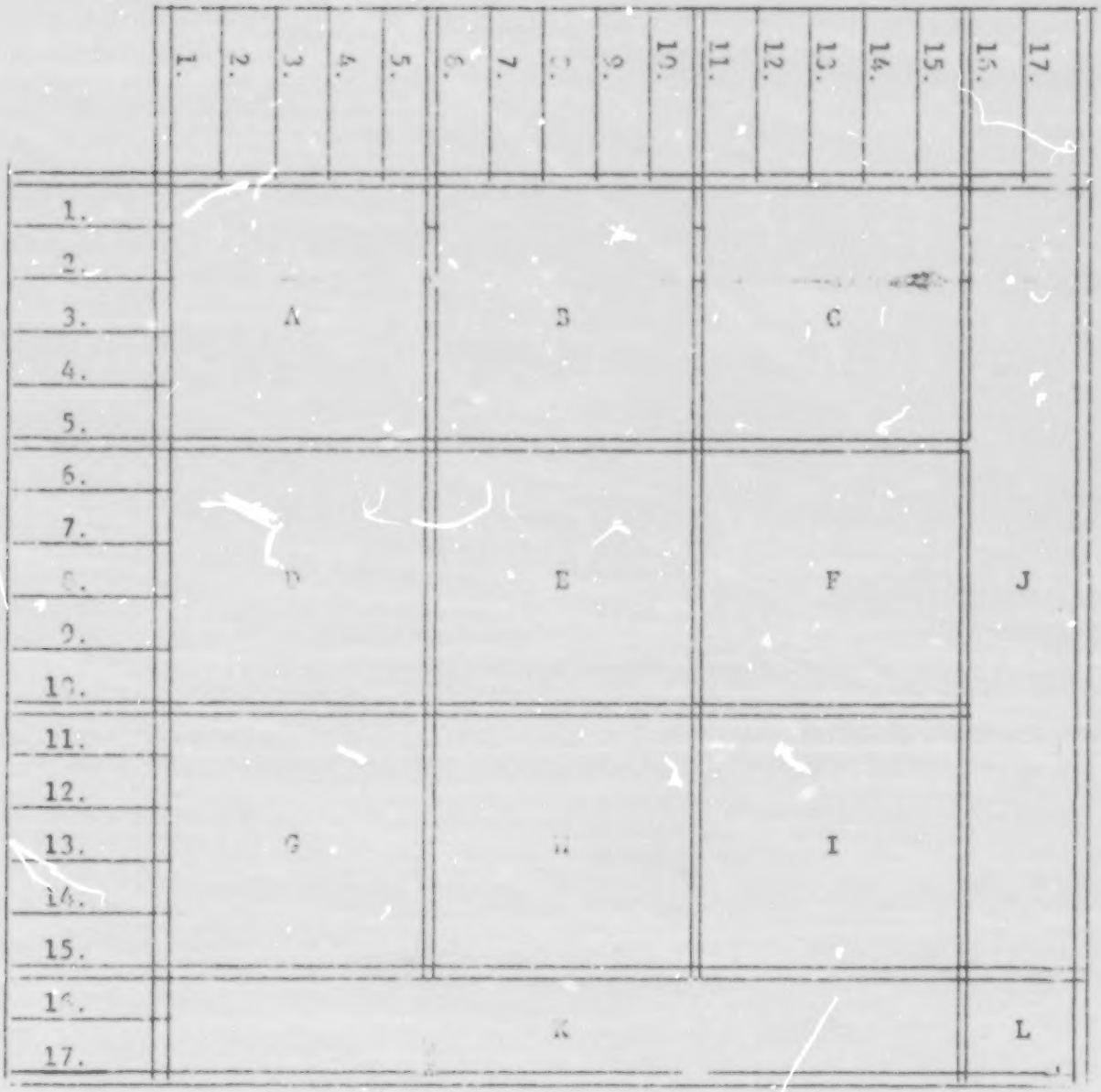

Figure 4: SSOR Matrix Segments

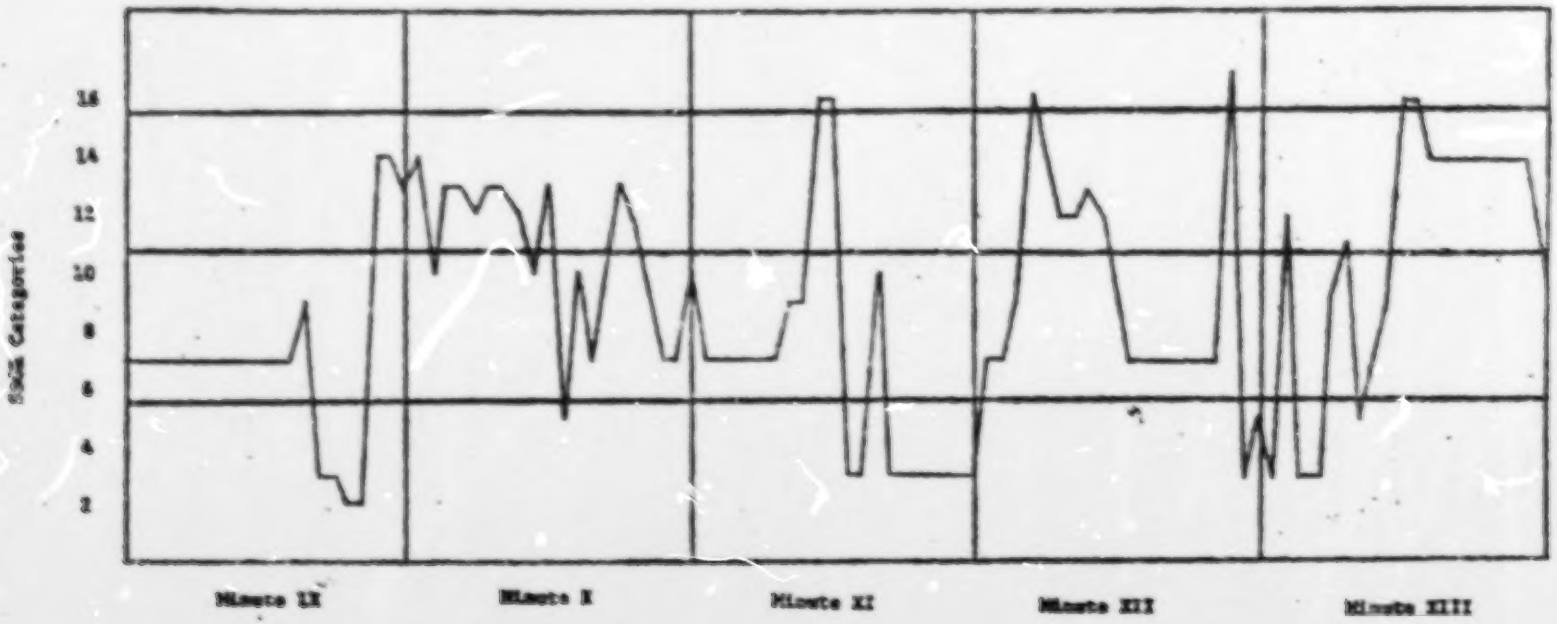

Figure 5: Graphed SSOR Data